Prevalence, Mechanisms, and Return to Sport After Isolated Popliteus Injuries in Athletes

A Systematic Review

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Background: Injuries to the posterolateral corner of the knee are commonly reported in athletes, although the prevalence of isolated injuries to the popliteus in athletes is largely unknown.

Purpose: To systematically review the literature to better understand the prevalence, mechanisms, sporting activities, tear characteristics, management, outcomes, and return-to-sport rate and timing in athletes who have sustained isolated popliteus injuries.

Study Design: Systematic review; Level of evidence, 4.

Methods: Following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, the authors searched the PubMed, OVID, MEDLINE, Biosis Previews, SPORTDiscus, PEDRO, and EMBASE databases for studies from January 1988 to August 2021 on athletes who sustained isolated popliteus injuries during sporting activities.

Results: A total of 19 studies consisting of 27 athletes with isolated popliteus injuries sustained during sport were identified. The mean athlete age was 19.9 ± 10.5 years, while 89% (n = 24/27) were male. Traumatic/contact mechanisms were reported in 67% (n = 18/27) of injuries, with American football and soccer being the most common sports. Lateral-sided knee pain was the most frequent complaint, with 85% (n = 23/27) of athletes reporting swelling. Avulsion injuries off the lateral condyle were present in 67% (n = 18/27) of cases. Nonoperative management was performed in 52% (n = 14/27) of athletes. Operative treatment consisted primarily of arthroscopic or open fixation of the osseous fragment. When reported, all athletes successfully returned to sport at a mean of 10.8 ± 8.2 weeks after injury.

Conclusion: Isolated injuries to the popliteus remain rarely reported in athletes, and athletes are typically evaluated after they experience forced external rotation of the tibia relative to the femur, present with lateral-sided knee pain and effusion, and undergo a stable ligamentous examination. Injuries occurred primarily in male athletes and were the result of traumatic/contact mechanisms, most commonly involving avulsion injuries off the lateral femoral condyle.

Keywords: popliteus; posterolateral corner; return to sport; tendon; knee; athlete

Knee injuries represent the most commonly reported musculoskeletal injury during sporting activities,[12] accounting for a substantial degree of time lost from sport.[19] The posterolateral corner (PLC) of the knee, consisting of the fibular collateral ligament, popliteofibular ligament, popliteus tendon, biceps femoris tendon, iliotibial band, lateral capsule, arcuate, and fabellofibular ligaments, functions to resist genu varum, while controlling external tibial rotation and posterior tibial translation.[35] PLC injuries have been reported to occur as a result of both contact and noncontact mechanisms during sporting activities and are frequently associated with injuries to the cruciate ligaments and meniscus,[23] with isolated PLC injuries reported to occur in only 5% of patients sustaining knee ligament injuries.[16]

As a major stabilizer to the PLC, the popliteus functions primarily to resist external tibial rotation, serving as a secondary stabilizer against internal rotation and varus stress, while also controlling against excessive posterior tibial translation and rotation.[15,17,24,32] Injuries to the popliteus are typically found in conjunction with injuries to the associated structures of the PLC, with the prevalence of isolated injuries to the popliteus being estimated to comprise only 10% of all injuries involving the PLC.[3,30] Specifically, in a survey of 2412 consecutive magnetic resonance imaging (MRI) scans of the

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knee, injuries to the popliteus were reported in 24 patients, with only 8.3% (n = 2/24) of cases involving an isolated popliteal injury.[3] Isolated popliteus injuries have generally been attributed to traumatic/contact mechanisms, with frequent reports of injury occurring as a result of sporting activities. However, the prevalence of isolated popliteus injuries in athletes remains largely unknown. Moreover, while both nonoperative and operative treatment strategies for isolated popliteus injuries have been reported, variables predicting optimal outcomes and successful return to sport (RTS) remain similarly undefined.

The purpose of this study was to systematically review the current literature to evaluate the prevalence, mechanism, sporting activities, tear characteristics, management, outcomes, and RTS rate and timing in athletes who have sustained isolated popliteus injuries. Based on prior studies, we hypothesized a low prevalence of injuries[1,30] that occur primarily because of traumatic/contact injuries sustained during competition,[13,24] with most patients treated nonoperatively[11,13,20] and with a high rate of RTS.[37]

METHODS

A systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement using a PRISMA checklist.[25] After registering the study on the PROSPERO International Prospective Register of Systematic Reviews (ID: 279865), we identified articles published from January 1988 to August 2021 on athletes who sustained isolated injury to the popliteus during sporting activity. A sporting activity was defined as any event in which an athlete was in competition with fellow athletes. Two reviewers (C.D.M., D.M.K.) independently conducted a qualitative systematic review of the literature in August 2021 using the following databases: PubMed, OVID, MEDLINE, Biosis Previews, SPORTDiscus, PEDRO, and EMBASE. Various combinations of the following search terms were performed: "popliteus" AND "popliteal" AND "injury" AND "rupture" AND "tear" AND "avulsion" AND "posterolateral corner" AND "athlete" AND "sport" AND "activity."

Studies qualified for inclusion in this systematic review if they were written in English or with an English-language translation, and if they documented isolated injuries to the popliteus occurring during sporting activity, with reported mechanism of injury, management (nonoperative vs operative), and patient outcome. Exclusion criteria included studies reporting popliteus injuries with associated injuries to the PLC of the knee, the cruciate ligaments, or the meniscus; studies of injuries occurring during nonsporting activities (jogging, mechanical falls, trauma, or all other activities not meeting the definition of a sporting activity); and studies not reporting outcomes after injury management.

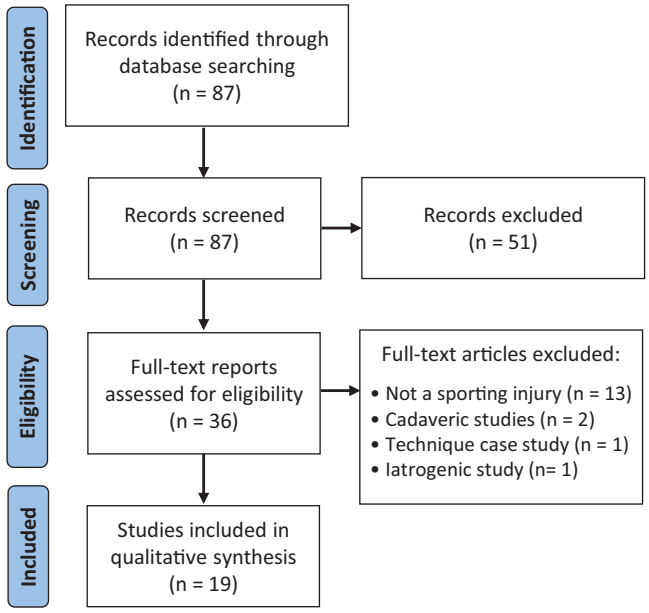

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart of the present study.

A total of 87 articles were identified in the initial search. Sequential screening of the articles was performed using the following systematic approach: assessment of duplicate articles, content within the article title, and content of the abstract, and full-text review. After inclusion and exclusion criteria were applied, 19 studies remained. To ensure that all available studies were identified, all references from the included studies were reviewed and reconciled to verify that no relevant articles were missing from the systematic review; no further studies were identified. The search process is shown in Figure 1.

The number of patients diagnosed with isolated popliteal injuries was calculated, along with mean patient age, mechanism of injury, sporting activity, management, outcomes, RTS rate and timing, and final follow-up time.

RESULTS

The 19 included studies comprised 27 athletes with isolated popliteus injuries sustained during a sporting activity. The mean athlete age was 19.9 ± 10.5 years (range, 11-59 years), although age was not reported in a single study of 1 athlete.[28] Athletes were predominantly male (89%; n = 24/27). The mean follow-up time after treatment was 4 months

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TABLE 1
Overview of Studies Included in the Review[a]

Lead Author (Year)	LOE	Sex (Age, y)	Sporting Activity (Level)	Injury Mechanism	Treatment	RTI, d	Follow-up, mo	RTS, wk
Traumatic/Contact								
Algazwi (2019)[1]	5	M (16)	Soccer (HS)	Lateral blow	Nonop	NR	3	12
Avery (2012)[2]	5	M (13)	Football (Rec)	Tackled	Nonop	4	18	26
Burstein (1990)[4]	5	M (24)	Football (Pro)	Lateral blow	Nonop	1	3	4
Conroy (2004)[5]	5	M (17)	Soccer (Pro)	Tackled	Operative	14	1.5	6
Garth (1992)[8]	4	M (12) M (14)	Football (Rec) (n = 1), Wrestling (Rec) (n = 1)	Lateral blow (n = 1), Twisting (n = 1)	Operative	1 (n = 1), NR (n = 1)	20 (n = 1), 12 (n = 1)	NR
Gruel (1990)[10]	4	M (16)	Football (NR)	Tackled	Operative	NR	NR	NR
Guha (2003)[11]	5	M (23)	Soccer (Semipro)	Lateral blow	Nonop	3	12	6
Koong (2018)[13]	5	M (22)	Rugby (Pro)	Lateral blow	Nonop	0	15	4
Koukoulias (2020)[14]	5	M (12)	Soccer (Rec)	Tackled	Operative	NR	24	24
Mariani (2009)[20]	5	M (31)	Soccer (Pro)	Falling	Operative	14	NR	7
Newcomb (2021)[24]	5	F (14)	Basketball (HS)	Falling	Nonop	28	72	10
Quinlan (2011)[27]	5	M (23)	Rugby (Pro)	Lateral blow	Nonop	0	NR	5
Sileo (2009)[33]	5	M (15)	Football (NR)	Player rolled onto posterior knee	Operative	121	NR	24
Wheeler (2008)[36]	4	M (13) M (13)	Football (NR) (n = 1), Rugby (NR) (n = 1)	External rotation (n = 1), Tackling (n = 2)	Nonop	NR	2	NR
Winge (1996)[37]	4	M (34) M (39)	Polo (Rec)	External rotation	Nonop	1	1.5	NR
Noncontact								
Geissler (1992)[9]	5	M (59)	Tennis (Rec)	External rotation	Nonop	2	6	NR
Gruel (1990)[10]	4	F (15)	Skiing (Rec)	Twisting	Operative	NR	30	12
Mirkopulos (1991)[21]	5	M (11)	Basketball (Rec)	Twisting	Operative	4	48	NR
Radhakrishna (2004)[28]	5	M (NR)	Football (Pro)	Landing in plantarflexion	Nonop	0	NR	1
Unspecified								
Nakhostine (1995)[22]	4	F (22) M (18) M (15) M (14)	Unspecified (NR)	External rotation	Operative	NR	32 (n = 1), 34 (n = 1), 53 (n = 1), 19 (n = 1)	NR
Wheeler (2008)[36]	4	M (14)	Soccer (NR)	Unspecified	Nonop	NR	2	NR

[a]In studies with more than 1 patient, cells with undifferentiated data apply to all patients. F, female; HS, high school; LOE, level of evidence; M, male; Nonop, nonoperative; NR, not reported; Pro, professional; Rec, recreational; RTI, reported time from injury; RTS, return to sport; Semipro, semiprofessional.

(range, 1-72 months), although follow-up time was not reported in a single study consisting of 2 athletes.[10] Table 1 provides an overview of each included study.

Mechanism

Traumatic/contact mechanisms that occurred primarily as a result of direct trauma to the lateral knee[1,4,8,11,13,20,24,27,36] accounted for 67% (n = 18/27) of isolated popliteus injuries (Table 1). Noncontact mechanisms, consisting largely of external rotation on a flexed knee,[9,10,21,28] composed 15% (n = 4/27) of injuries. Injury mechanism was not reported in 19% (n = 5/27) of injuries.[22,36] The most commonly reported involved sports were American football (n = 7),[2,4,8,10,28,33,36] soccer (n = 6),[1,5,11,14,20,36] and rugby (n = 3).[13,27,36]

Presentation

The mean time from injury to presentation was 11.8 days (range, 0-121 days). Pain to the lateral aspect of the knee was reported in 96% (n = 26/27) of athletes, with swelling ranging from mild to marked effusion in 85% (n = 23/27) of cases[§] and calf swelling in 1 athlete.[4] Other reported symptoms included the sensation of knee instability,[27,28] inability to bear weight,[2] and restricted knee range of motion because of pain.[2,7] Four

[§]References 1, 2, 4, 5, 8–11, 13, 14, 21, 22, 28, 33, 36.

TABLE 2
Overview of Studies on Nonoperative Treatment (n = 11)[a]

Lead Author (Year)	Tear Location (Extent)	Imaging	Description of Nonoperative Management
Algazwi (2019)[1]	Bony avulsion (complete)	XR, MRI	Knee brace 6 wk, overlapping PT with strengthening and graded activity
Avery (2012)[2]	Bony avulsion (complete)	XR, MRI	Long-leg hinged knee brace, no ROM or weightbearing restrictions. Concurrent PT for 4 mo
Burstein (1990)[4]	Intrasubstance (complete)	MRI	Initial treatment with PT and return to play, arthroscopy after persistent effusion and pain, no further surgical treatment. Additional PT after arthroscopy for 4 wk and return to play. Full ROM with occasional mild ache on lateral knee reported at 3 mo
Geissler (1992)[9]	Intrasubstance (complete)	XR, MRI	6 wk of "nonoperative management"
Guha (2003)[11]	Avulsion (complete)	XR, MRI	Persistent effusion requiring arthroscopic washout, followed by 6-wk rehabilitation program
Koong (2018)[13]	Avulsion (complete)	XR, MRI	4 days of rest; gradual return over 2 wk with PT
Newcomb (2021)[24]	Intrasubstance (partial)	MRI	Progressive return to normal level of activity with avoidance of impact activities for 6 wk
Quinlan (2011)[27]	MTJ (NR)	MRI	Massage, joint mobilizations, static and dynamic retraining
Radhakrishna (2004)[28]	Intrasubstance (partial)	MRI	Rest, ice, daily massage, ROM exercises
Wheeler (2008)[36]	Bony avulsion (complete)	XR, MRI	Bracing and PT, no further specifications
Winge (1996)[37]	Intrasubstance (partial)	XR, MRI	Immobilized for 1 d; rest, PT for 6 wk (n = 1),
		MRI	Rest, PT for 6 wk (n = 1)

[a]In studies with more than 1 patient, cells with undifferentiated data apply to all patients. MRI, magnetic resonance imaging; MTJ, tear at musculotendinous junction; NR, not reported; PT, physical therapy; ROM, range of motion; XR, radiograph.

athletes reported minimal pain[4] or were reported to have continued play for at least several minutes after injury.[4,5,13,20] Six athletes were unable to continue play because of a sensation of instability[21,22] or pain while running, jumping, or twisting.[2,11,24] A distinct "pop" was heard in 2 athletes sustaining acute injury secondary to being rolled onto by another player[33] or after falling.[24] Knee instability, defined by the presence of a positive dial test with >10° of external rotation at 30° and 90° of knee flexion and confirmed with a "drive-through" sign on arthroscopy, was reported in 1 athlete.[14]

Tear Location

Tables 2 and 3 provide injury and treatment information for the included studies. Initial radiography was performed on 74% (n = 20/27) of injuries, followed by MRI[1,2,9,11,13,33,36,37] or diagnostic arthroscopy[8,10,21,22] to confirm the diagnosis of an isolated popliteus injury. Injuries most commonly involved avulsions of the popliteus tendon from the lateral femoral condyle (67%; n = 18/27), followed by intrasubstance muscular or tendonous tearing (30%; n = 8/27)[4,5,9,20,24,28,37] or tearing at the musculotendinous junction (4%; n = 1/27).[27] Based on injury grade, all avulsion injuries were complete tears with 78% (n = 14/18) of avulsions involving an associated osteochondral injury. Five intrasubstance injuries were noted to be incomplete tears,[20,24,28,37] with 3 reported as complete tears.[4,5,9]

Treatment

Nonoperative management was performed in 52% (n = 14/27) of isolated popliteus injuries, consisting of a combination of rest,[13,24,28,37] bracing,[1,2,36] and massage[27,28] (Table 2). Bracing times were specified in 2 studies as 4 weeks[2] and 6 weeks.[1] Physical therapy was frequently prescribed,[1,4,9,11,13,36,37] with an emphasis on knee range of motion exercises and strengthening programs that target the gastrocnemius-soleus complex, hamstrings, and quadriceps. Static and dynamic proprioceptive retraining to facilitate progressive return to running was reported in 1 professional athlete.[27] No athletes were noted to undergo operative management of their popliteus injury after a trial of nonoperative treatment.

Initial operative management was performed in 48% (n = 13/27) of athletes. Operative repair consisted of arthroscopic reduction and fixation of the popliteus tendon[8,14,22] (n = 4), open repair[21,22] (n = 4), arthroscopic debridement of the tendon stump[5,20] (n = 2), arthroscopic removal of osteochondral fragment[10] (n = 2), and open resection of calcified tendon with repair of remaining stump to capsular tissue[33] (n = 1) (Table 3). Tendon fixation was performed using either 1 or 2 absorbable suture anchors,[8,14] screws[8,21,22] or staples.[22] Five studies detailed postoperative rehabilitation.[8,14,20,22,33] Physical therapy was initiated immediately[8,14,22] or at 2 weeks after surgery.[20] Postoperative bracing utilizing functional braces[14,22] was prescribed for 2 to 4 weeks.[8,20,22] Weightbearing restrictions after surgery ranged from no restrictions[8,33] to partial or nonweightbearing restrictions.[8,14,22] Patients were full weightbearing from 4 weeks[8] to 8 weeks[14] after surgery.

Return to Sport

RTS was reported in 13 studies (13 athletes), with all reported athletes successfully returning to sport (Table 1). The mean overall RTS timing was 10.8 ± 8.2 weeks after injury. Athletes with intrasubstance tears returned at a mean of 5.6 ± 3.0 weeks, compared with 15.4 ± 8.5 weeks for athletes with avulsion injuries.

TABLE 3
Overview of Studies on Operative Treatment (n = 8)[a]

Lead Author (Year)	Tear Location (Extent)	Imaging	Surgical Intervention	Fixation Method	Postoperative Treatment
Conroy (2004)[5]	Intrasubstance (complete)	MRI	Arthroscopic debridement of stump	—	NR
Garth (1992)[8]	Bony avulsion (complete)	XR	Arthroscopic fixation	20-mm screw (n = 1),	Full weightbearing immediately, knee immobilizer for 3 wk, failed to return for further PT (n = 1)
				Absorbable suture (n = 1)	Immediate PT, progression from partial to full weightbearing by 4 wk (n = 1)
Gruel (1990)[10]	Bony avulsion (complete)	XR	Arthroscopic removal of OC fragment	—	NR
Koukoulias (2020)[14]	Avulsion (complete)	XR, MRI	Arthroscopic fixation	Absorbable suture (n = 2)	Functional knee brace 0°-30° ROM immediately with progression to full weightbearing and ROM by 8 wk
Mariani (2009)[20]	Intrasubstance (partial)	MRI	Open stump debridement	—	Full weightbearing in a brace for 4 wk, return to full weightbearing without a brace and ROM by 7 wk
Mirkopulos (1991)[21]	Bony avulsion (complete)	XR	ORIF	28-mm screw	NR
Nakhostine (1995)[22]	Bony avulsion (complete)	XR	ORIF (n = 3), Arthroscopic fixation (n = 1)	Staple (n = 3), 35-mm screw (n = 1)	Knee brace for 4 wk, partial weightbearing for the first 2 wk with a gradual increase, PT immediately postoperatively
Sileo (2009)[33]	Avulsion (complete)	XR, MRI	Open resection of ossified tendon, repair of remaining tendon to underlying capsular tissue	NR	Weightbearing as tolerated, no restriction to ROM after incision had healed

[a]In studies with more than 1 patient, cells with undifferentiated data apply to all patients. Dashes indicate data not applicable. MRI, magnetic resonance imaging; NR, not reported; OC, osteochondral; ORIF, open reduction, internal fixation; PT, physical therapy; ROM, range of motion; XR, radiograph.

Complications

Complications after management were reported in 3 athletes undergoing nonoperative treatment secondary to posterior tibial nerve palsy[9] or persistent effusion.[4,11] Posterior tibial nerve palsy was reported in 1 athlete who had reduced active plantarflexion and altered sensation over the medial and plantar aspects of the foot and an MRI showing fluid collection in the posterior calf suggestive of partial posterior tibial nerve involvement.[9] Full recovery was reported after 6 months of nonoperative management.[9] Persistent effusion was reported in 1 athlete that required arthroscopic decompression without addressing the injury to the popliteus.[11] Meanwhile, arthroscopic exploration was performed in 1 athlete because of persistent effusion and tenderness after initiation of physical therapy.[4] Arthroscopic examination revealed a complete rupture of the popliteus tendon with no associated instability. No further surgical treatment was performed, and the patient returned to play after 4 weeks.

DISCUSSION

The main findings from this investigation were that 27 athletes from 19 studies were identified as having sustained an isolated injury to the popliteus during sporting activity at an average age of 19.9 ± 10.5 years, with 89% of athletes being male. Traumatic/contact mechanisms were responsible for 67% of the injuries, which occurred primarily during participation in American football, soccer, and rugby. Injuries most commonly involved complete avulsions from the lateral femoral condyle. Nonoperative management was performed in 52% of athletes, while operative treatment, primarily involving arthroscopic or open fixation, was performed in 48% of athletes. No complications were reported in athletes undergoing operative treatment, while 1 athlete experienced posterior tibial nerve palsy and 2 experienced persistent effusion requiring aspiration or arthroscopy without treatment of the popliteus injury during nonoperative treatment. When reported, all athletes were noted to successfully RTS at a mean of 10.8 ± 8.2 weeks after injury.

Traumatic mechanisms, primarily involving a lateral blow to the knee or forced external rotation as a result of being tackled, were reported in 67% of athletes sustaining isolated injuries to the popliteus during sporting activities. Patients sustaining traumatic injuries typically reported acute forced external rotation of the tibia on a partially flexed knee; however, falls onto an extended knee or forced hyperextension were also reported.[6,8,29] While no specific

injury mechanism has been identified as resulting in isolated injuries to the popliteus, it has been hypothesized that because of the function of the popliteus as a dynamic stabilizer, reflex contraction at the time of injury may contribute to the isolated nature of the injury.[36] Similarly, noncontact mechanisms have been attributed to forced external rotation of the tibia with an associated varus force applied to a fixed tibia.[13]

Patients with isolated injuries to the popliteus generally reported pain to the lateral aspect of the knee, while swelling was reported in 85% of injuries. While physical examination findings are often nonspecific,[24] a high index of suspicion should be present in patients evaluated with posterolateral knee pain to the joint line or along the course of the popliteus tendon[8] in the setting of a present or resolved effusion with discomfort on range of motion. While the majority of reported injuries to the PLC involve multiple ligaments, specific injury mechanisms, primarily those involving excessive external rotation of the tibia relative to the femur, should raise the suspicion of a potential popliteus injury with or without associated PLC involvement. Patients often deny any sensation of instability and possess a stable knee on physical examination.[11,24,31] Preservation of knee stability is often attributed to the intact remaining structures of the PLC that effectively compensate for the injured popliteus.[22] However, the presence of PLC instability has been reported, further emphasizing the necessity of a detailed physical examination.[14] The Garrick test, while not proven to be reliable or reproducible, has been reported to help identify patients with popliteus injuries. With the patient in the supine position, the hips and knee are flexed to 90°; a positive test result is when patients report having posterolateral pain during resisted internal rotation or passive external rotation.[7,28,33] Meanwhile, the popliteus tendon has been reported to be best examined with the patient in the prone position, with the clinician palpating the posterior joint line just medial to the biceps femoris.[26]

Patients have also been reported to possess accentuated external rotation of the tibia with flexion on examination.[24] Radiographs may show normal findings or demonstrate evidence of a bony fragment off the lateral aspect of the knee in the setting of bony avulsion injuries.[36] MRI is necessary to confirm the diagnosis and may commonly demonstrate evidence of an avulsion of the tendon from its femoral attachment, with less frequent findings consisting of an irregular tendon contour within the popliteal hiatus or disorganized fibers within the musculature of the popliteus.[3,30] As such, isolated injuries to the popliteus should be suspected and investigated in athletes with posterolateral knee pain and a reported history of swelling, especially after forced external rotation mechanisms of injury of the tibial relative to the femur, in the presence of a stable knee on examination.[9,11]

Nonoperative management was performed in 52% of athletes, with 48% undergoing operative treatment for isolated injuries to the popliteus. Because of the limited number of articles reporting treatment in athletes sustaining isolated popliteal injuries, no definitive management algorithm has been established in the literature.[33] A trial of nonoperative management involving early weightbearing and functional rehabilitation has been advocated in patients with isolated injuries to the popliteus, as isolated injuries uncommonly lead to knee instability.[24] However, nonoperative rehabilitation protocols remain largely heterogenous with little specificity.[24] Meanwhile, operative management has been recommended in patients with popliteus tendon injuries associated with an avulsed osteochondral fragment off the femoral attachment[13,18,33] and in patients with PLC instability[14] restore popliteal function while preserving the native kinematics of the knee. As such, isolated injuries to the popliteus in athletes should be tailored to the individual athlete, and further studies are warranted to identify athlete- and injury-specific variables predictive of improved outcomes and RTS based on management.

When reported, all athletes successfully returned to sport at a mean time of 10.8 ± 8.2 weeks, with athletes sustaining intrasubstance tears returning quicker compared with those with avulsion injuries; there was no difference in RTS timing based on management. The high rate of RTS may be because of the isolated nature of the injury, with preservation of the remaining PLC ligaments maintaining the overall stability of the knee.[34] Meanwhile, quicker RTS timing in intrasubstance injuries is likely related to the higher rate of healing when compared with avulsion injuries, especially those with bony involvement.

Limitations

This study is not without limitations. Because of the heterogeneity of patient-reported outcomes, no meaningful statistical analyses could be performed across the included studies, and analyses of outcomes and RTS rate and timing based on tear location, experience level, sporting activity, and prevalence of complications were limited secondary to infrequent and inconsistent reporting in the included studies. Any potential correlations of the Garrick test to injury characteristics of the popliteus found on advanced imaging were not examined because the test is performed in only a small number of athletes, warranting further studies to establish the reliability and reproducibility of the test. As a result of the small number of studies identified, the authors elected to include athletes with less than 2 years of follow-up, demonstrating the need for additional studies evaluating mid- and long-term outcomes after isolated popliteus injury management in athletes.

CONCLUSION

Isolated injuries to the popliteus remain rarely reported in athletes. Typically, athletes are evaluated after they experience forced external rotation of the tibia relative to the femur and have lateral-sided knee pain and effusion upon a stable ligamentous examination. These types of injury occur primarily in male athletes as a result of traumatic/contact mechanisms that most commonly involve avulsion injuries off the lateral femoral condyle.

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